

Supporting Information

Hypoxia is increasing in the coastal zone of the Baltic Sea

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Table S1. Data sources for the analysis of hypoxia in the coastal zone of the Baltic Sea. All known data sources for oxygen concentrations in the coastal zone of the Baltic Sea were compiled. The list of data providers are in Table S1. Most of the data assembled are archived in the Baltic Environmental Database (BED) (<http://nest.su.se/models/bed.htm>) of the Baltic Nest Institute, Stockholm University. However, data from Russia and from the Himmerfjärden, Ulf Larsson, Systems Ecology, Stockholm University are not archived in the BED database. Access to the data can be obtained from the original data holders identified in Table S1. The location of monitoring data used in this study were partitioned into different regions largely following the division of HELCOM – The Helsinki Commission: Baltic Marine Environmental Protection Commission (Figure S1).

Country	Data Host	Provider	Access Level
Denmark	National Environmental Research Institute	Jacob Carstensen	Public access
Estonia	Estonian Marine Institute	Jonne Kotta	Restricted
Finland	Finnish Environmental Institute	Jouko Rissanen	Public access
Germany	Bundesamt fuer Seeschiffahrt und Hydrographie (BSH)	Sunhild Wilhelms	Public access
Latvia	Latvian Institute of Aquatic Ecology	Juris Aigars	Restricted
Lithuania	Environmental Protection Agency	Nijolė Remeikaitė-Nikienė	Restricted
Poland	Chief Inspectorate for Environmental Protection	Elzbieta Lysiak-Pastuszak	Restricted
Russia	Russian Academy of Science	Alexey Maximov	Restricted
Sweden	Swedish Meteorological & Hydrological Institute	Philip Axe	Public access
Sweden	Stockholm University	Ulf Larsson	Restricted

Table S2. Identified seasonal windows for calculating trends in oxygen concentrations (Figure 4, manuscript). The seasonal windows cover the summer and autumn months when the seasonal trend in bottom oxygen becomes decoupled from the seasonal trends in the surface water. Bottom water oxygen concentrations reached their annual minimum at different times of the year and for different amounts of time partly depending upon their geographical location. Therefore, seasonal windows where hypoxia occurs were calculated using the mean monthly profiles.

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bothnian Bay												
The Quark												
Bothnian Sea												
Stockholm												
Archipelago												
Finnish Archipelago												
Gulf of Finland												
Gulf of Riga												
Western Gotland basin												
Eastern Gotland basin												
Southern Baltic Proper												
Belt Seas												
The Sound												
The Kattegat												
Limfjord												

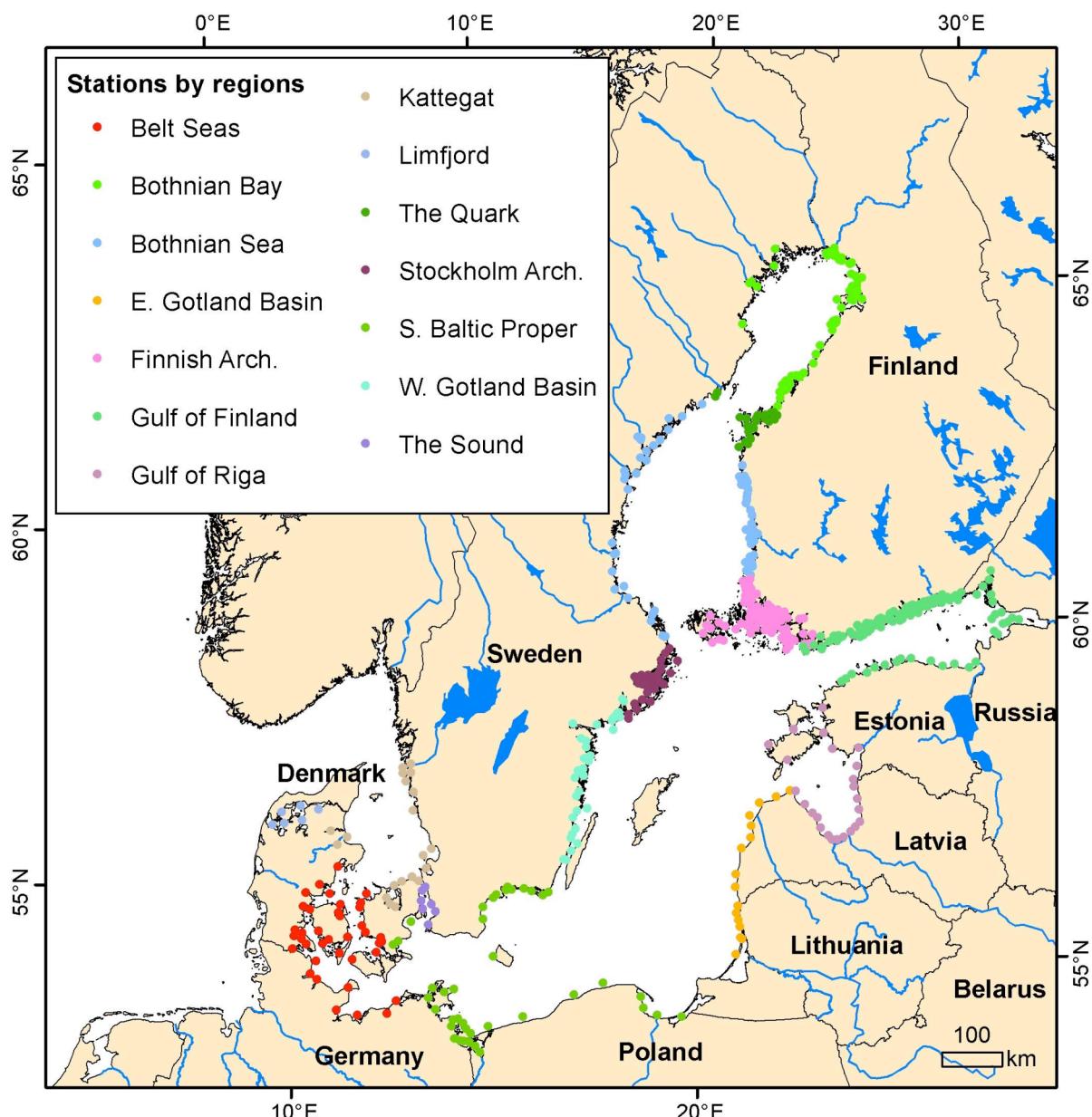


Figure S1. Location of monitoring data used in the study, partitioned into different regions, largely following the regional division from HELCOM.

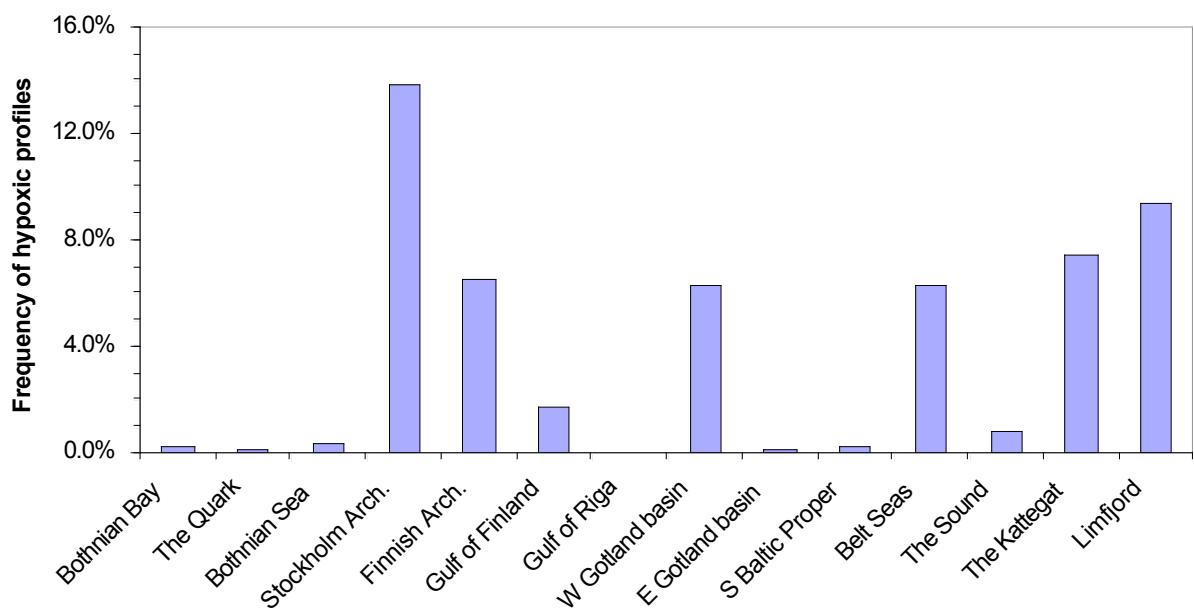
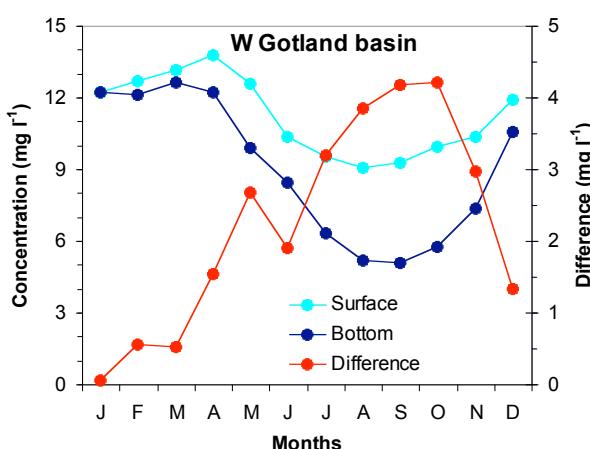
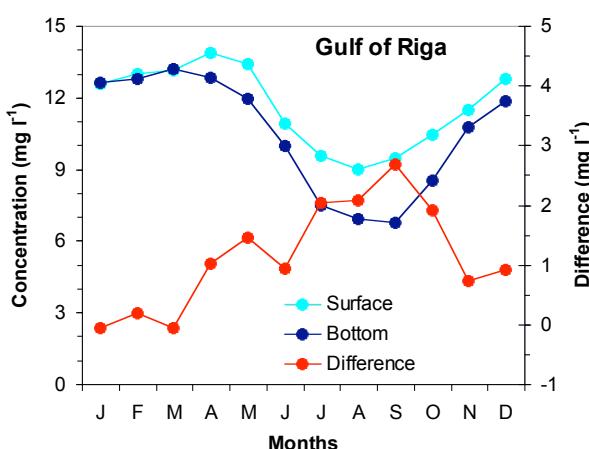
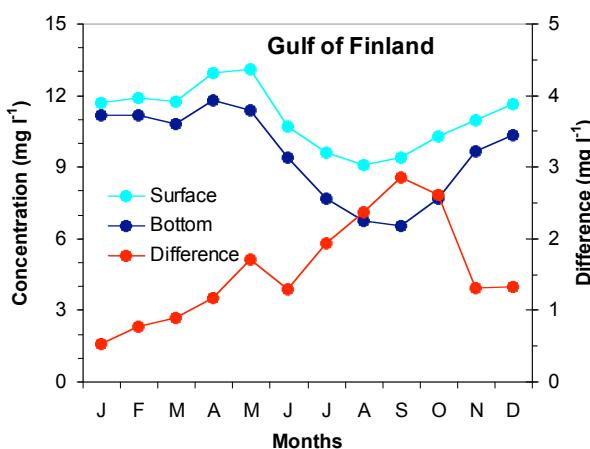
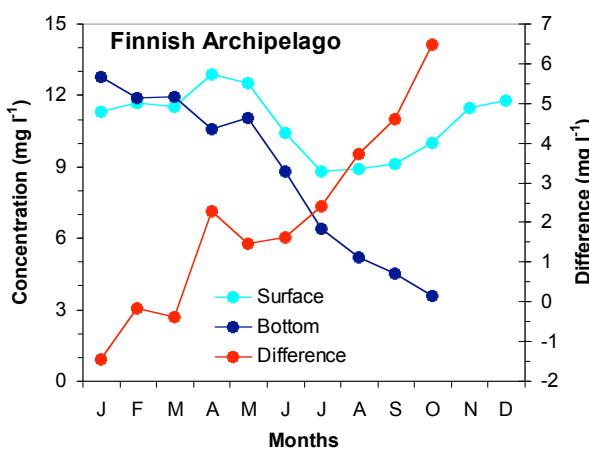
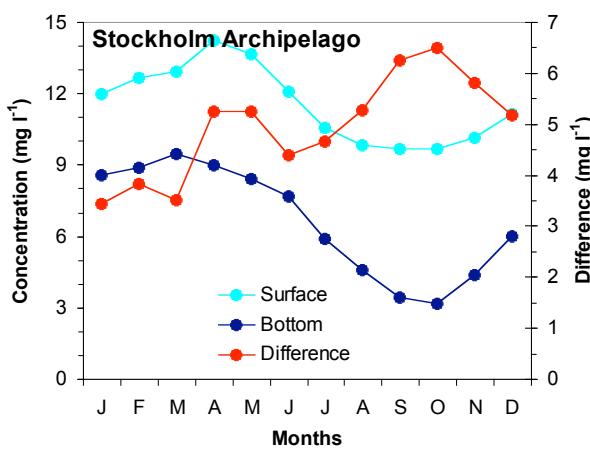
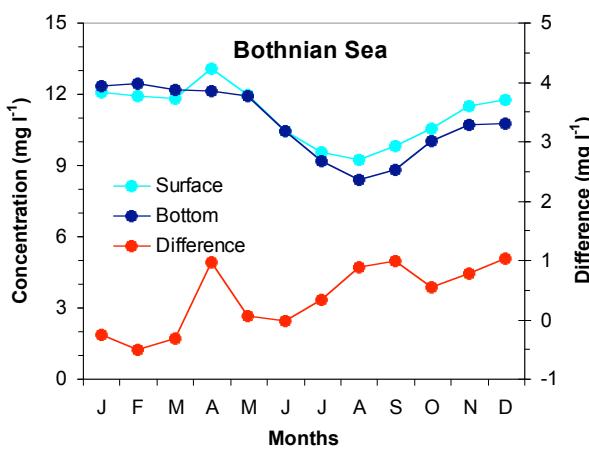
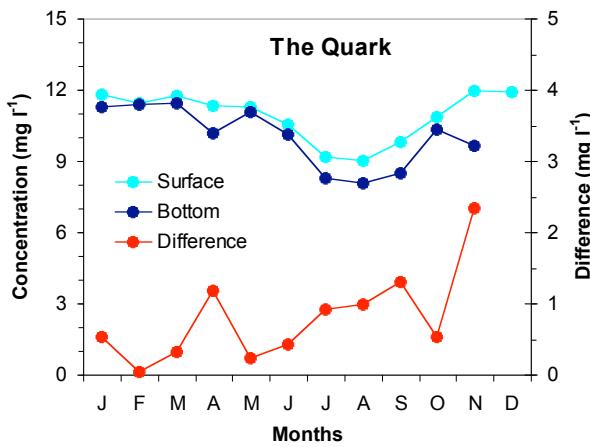
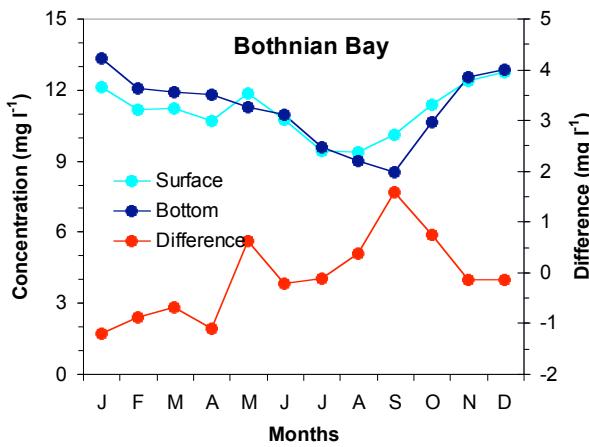


Figure S2. The number of hypoxic profiles relative to the total number of profiles for the different regions of the Baltic Sea over the entire period (1955-2009).



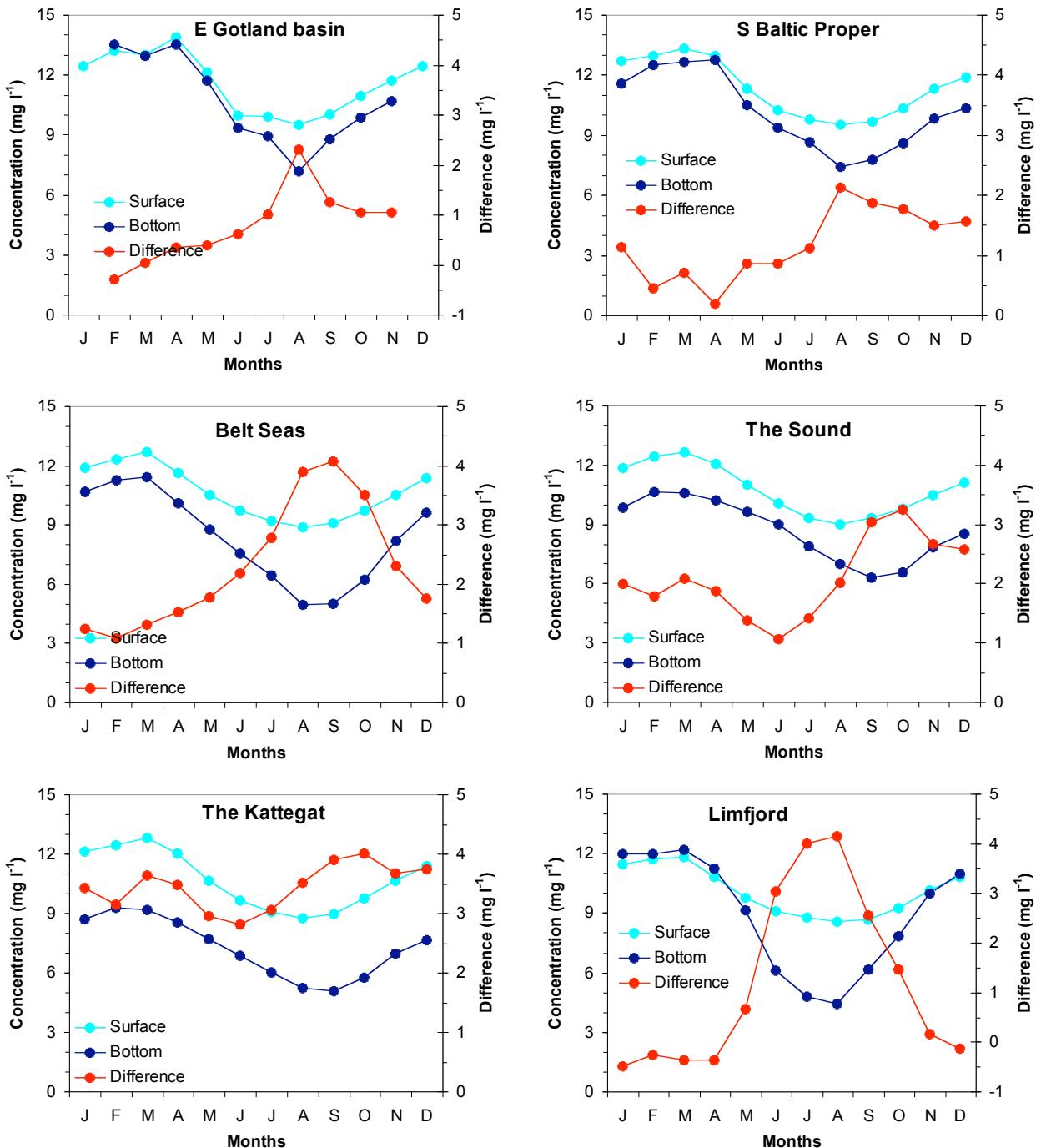
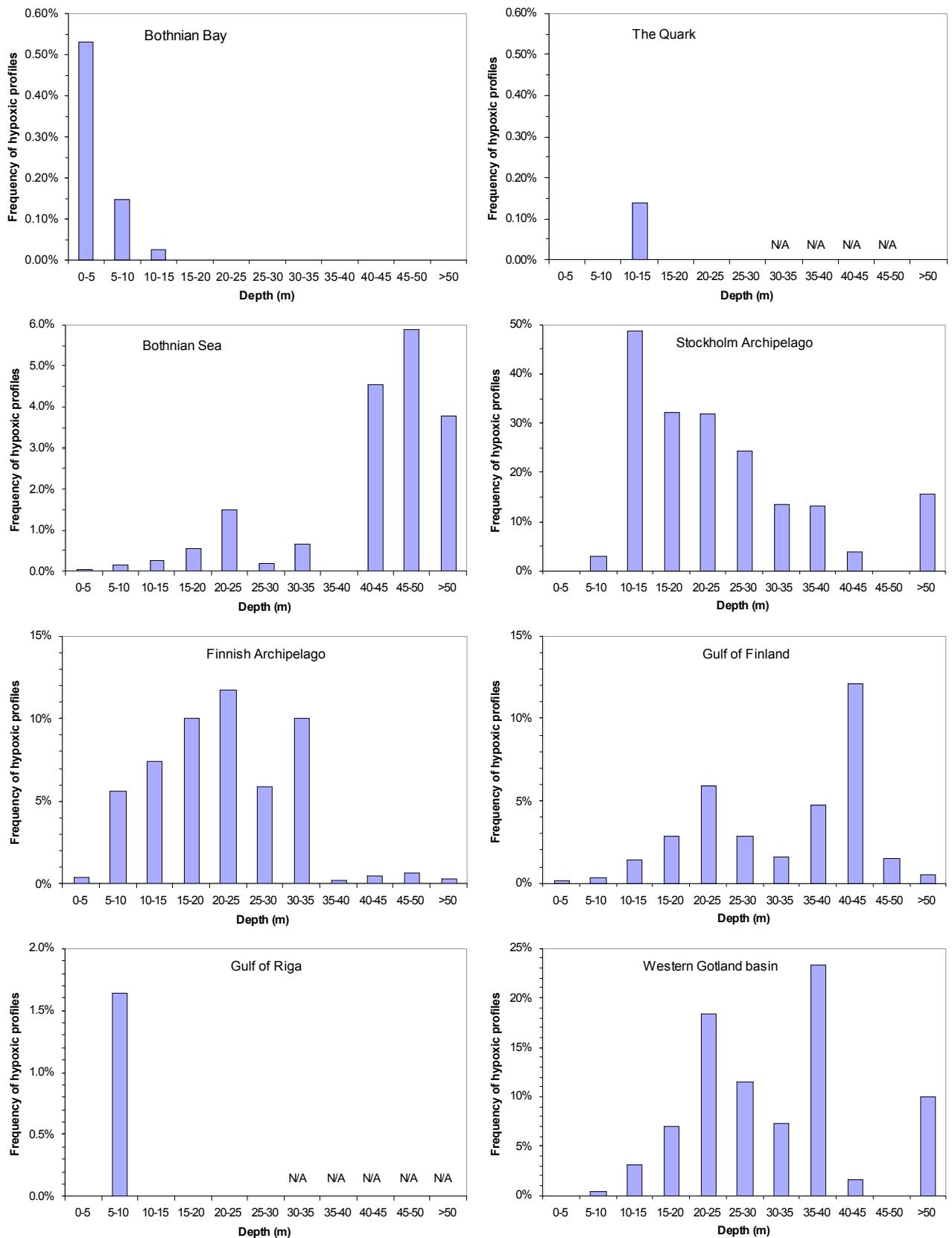


Figure S3. Seasonal variation in surface and bottom water oxygen concentration as well as their difference for the 14 regions delimited in Figure S1. Bottom oxygen means were calculated only when the density difference between surface and bottom was above 0.5, i.e. indicative of a stratified water column. Seasonal patterns in water column oxygen concentrations were observed across the entire Baltic Sea coastal zone with August and September generally being the peak months for

hypoxia in all regions. Further south in the Baltic Sea coastal zone hypoxia also occurred in October and in some cases into November in the Sound and the Kattegat coastal regions. The periods of time, e.g. the seasonal window when hypoxia appears, used for calculating trends in oxygen concentrations, are in Table S2.



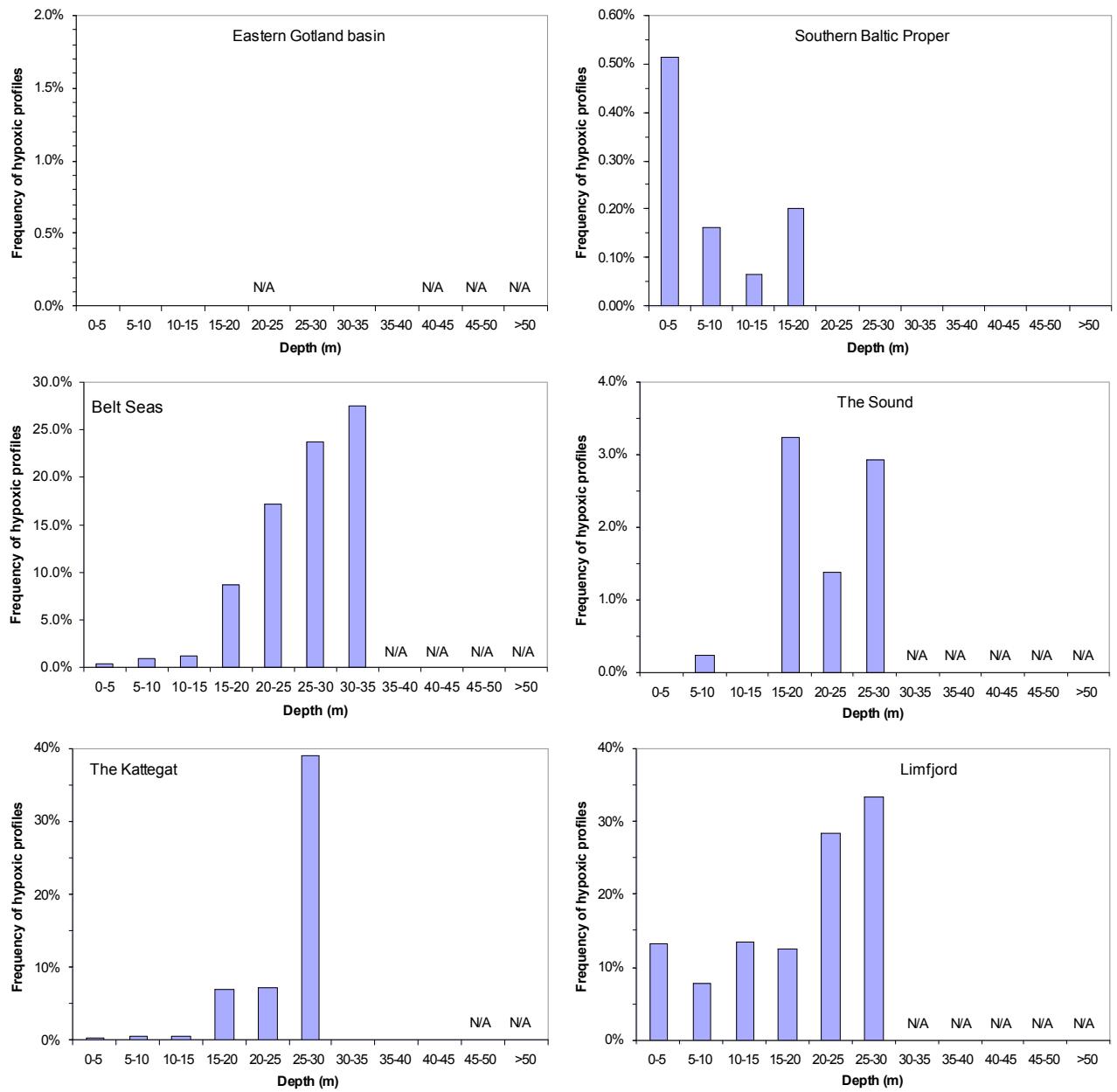
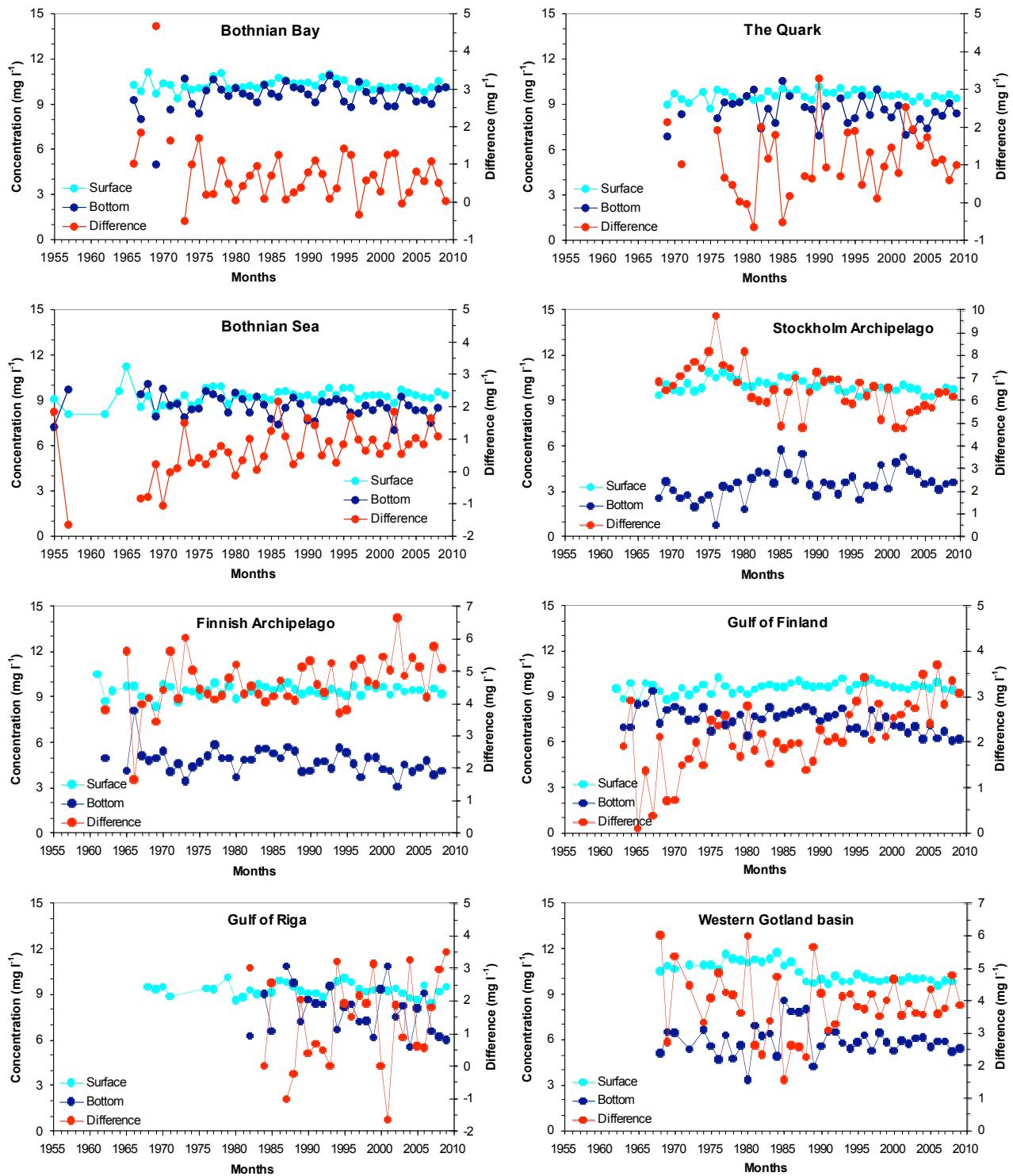


Figure S4. Depth-distribution of profiles with hypoxia ($< 2 \text{ mg l}^{-1}$) relative to the total number of profiles for the 14 regions delimited in Figure S1.



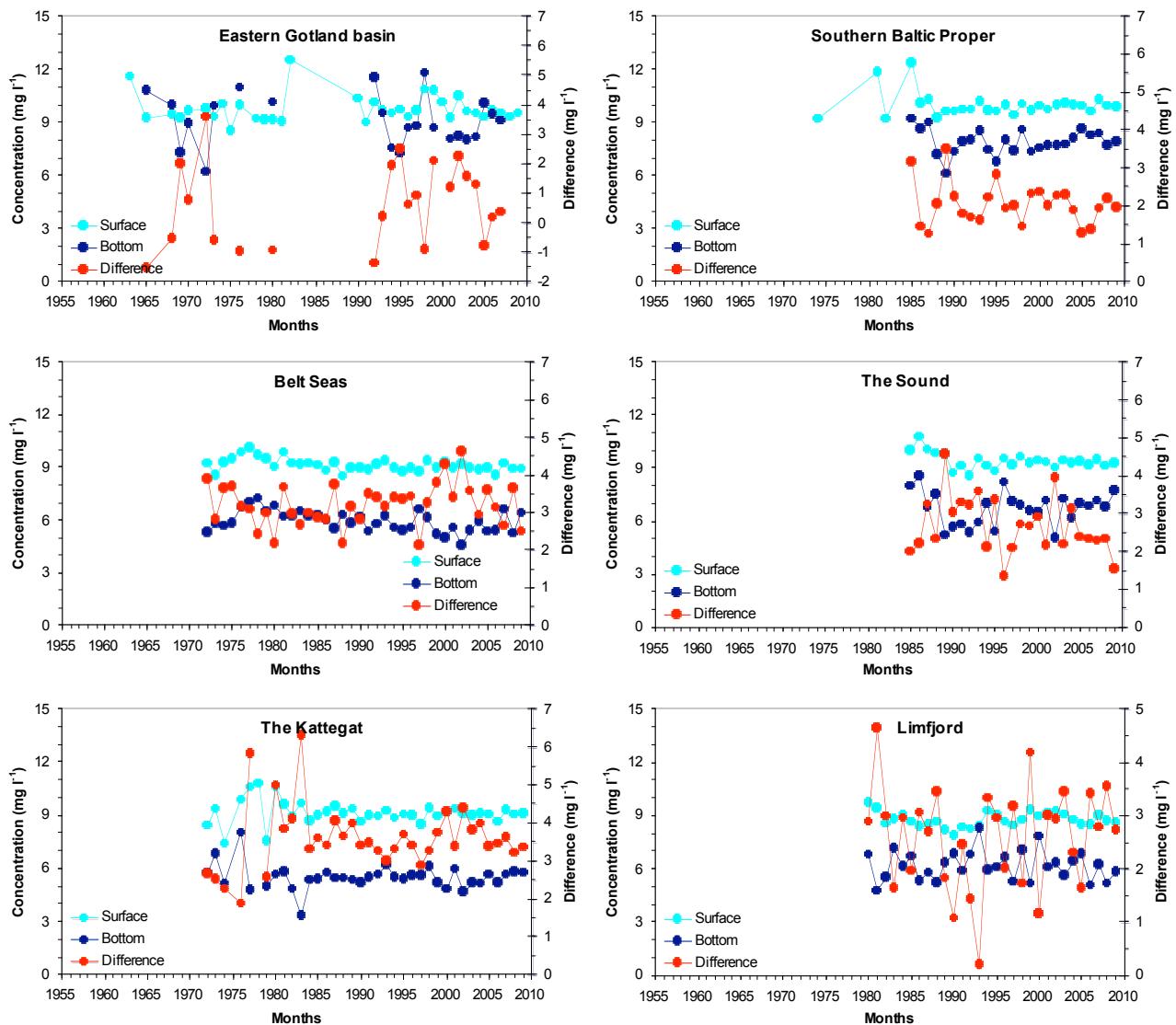


Figure S5. Trends in surface and bottom water oxygen concentration as well as their difference for the 14 regions delimited in Figure S1 using the seasonal windows defined in Table S2. Bottom oxygen means were calculated only when the density difference between surface and bottom was above 0.5, i.e. indicative of a stratified water column. All sites, including both sites with and without hypoxia, were included.